

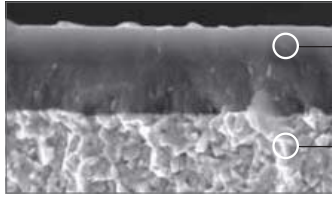
Genel kesim için yüksek etkinlikte ve ekonomik parmak freze

Z⁺ Endmill

- HRC47 'ye kadar geniş aralıklarda çeşitli iş parçası materyalleri
- Kabadan finişe geniş uygulama aralığı
- Yeni iç yapı ve gelişmiş kaplama tabakaları sayesinde artırılmış ürün ömrü
- İyileştirilmiş kesici ağızı dizaynı sayesinde talaşlanma önleni ve kesim süresi genişledi

Özellikler

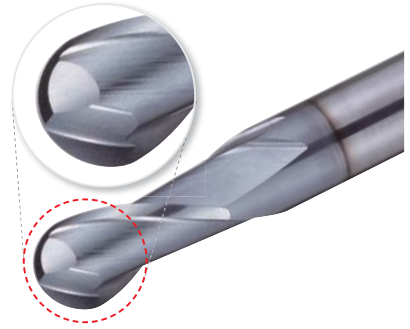
- Geniş aralıklarda iş parçası materyalleri - Karbon çelik alaşımlı çelik, döküm demir vb
- Artırılmış ürün ömrü - Yeni olarak yapılmış iç yapı ve yüksek teknoloji kaplama tabakaları uygulandı
- Daha yüksek üretkenlik - Kabadan finişe geniş uygulama aralığı



PC320U

AlCrSiN kaplama tabakası
: Yüksek hız/ısıda işlemeyi olanaklaştıran kaplama yağlaması

Ultra-ince iç yapı
: Mükemmel aşınma dirençli iç yapı uygulandı



Z⁺ Endmill

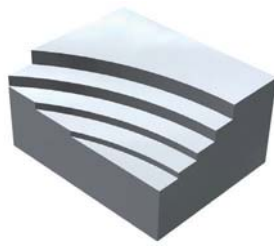
Özel kesim kenarı sertliği



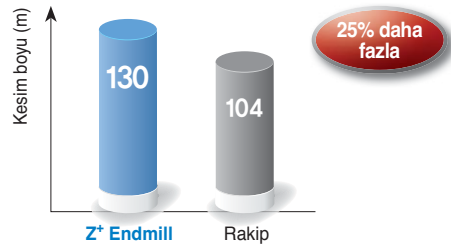
Rakip

Uygulama örnekleri

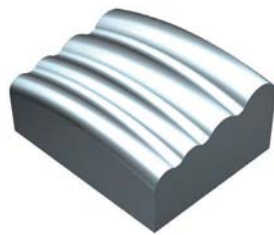
- İş Parçası Karbon Çelik (C45, ~HRC20)
- Kesme koşulu vc (m/dak) = 180, fz (mm/diş) = 0.05
ap (mm) = 8, Kuru
- Takımlar ZPFE4080-060



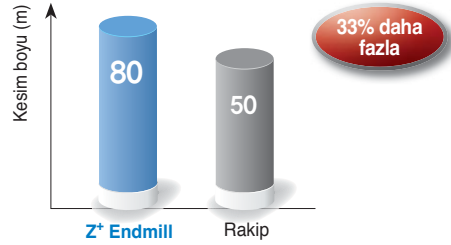
Test sonucu



- İş Parçası Karbon Çelik (C45, ~HRC20)
- Kesme koşulu vc (m/dak) = 130, fz (mm/diş) = 0.1
ap (mm) = 0.5, Kuru
- Takımlar ZPBE2080-100



Test sonucu



Parmak Frezeler



F

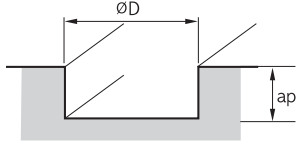
45

F Z⁺ Endmill için Teknik Bilgi

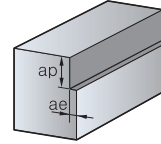
Önerilen Kesme Koşulu (ZPFE2000/ZPSFE2000 Düz)

İş Parçası Kesim Koşulları Çap (Ø)	Alaşımlı çelik ve karbon çelik (HRC30 altında)		Sertleşme öncesi çelik (HRC30~47)		Paslanmaz çelik	
	Devir n (dak ⁻¹)	İlerleme vf (mm/dak)	Devir n (dak ⁻¹)	İlerleme vf (mm/dak)	Devir n (dak ⁻¹)	İlerleme vf (mm/dak)
1	19,745	175	13,057	100	10,500	70
2	11,560	190	7,560	120	6,300	90
3	8,920	210	5,560	140	4,620	120
4	7,560	300	4,620	180	3,880	150
5	6,300	320	3,780	190	3,160	160
6	5,560	350	3,360	220	2,840	180
8	4,200	380	2,520	200	2,100	180
10	3,260	330	2,000	160	1,680	160
12	2,740	280	1,680	130	1,360	130
16	2,200	220	1,360	110	1,060	110

Uygulama



- Kanal işleme derinliği (ap)
 - $D \leq \varnothing 2.5$ (ap = 0.3D)
 - $D > \varnothing 2.5$ (ap = 0.5D)



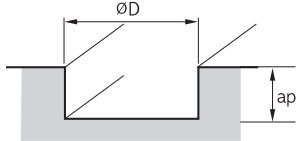
- Dik kenar frezeleme derinliği (ap)
 - $D \leq \varnothing 2.5$ (ap = 1.5D, ae = 0.05D)
 - $D > \varnothing 2.5$ (ap = 1.5D, ae = 0.1D)

* İş parçası sertçe bağlanmalı. Titreşim durumunda, R.P.M. ve ilerleme oranını aynı oranda azaltın

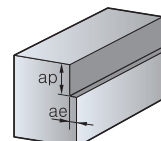
Önerilen Kesme Koşulu (ZPFE4000/ZPSFE4000 Düz)

İş Parçası Kesim Koşulları Çap (Ø)	Alaşımlı çelik ve karbon çelik (HRC30 altında)		Sertleşme öncesi çelik (HRC30~47)		Paslanmaz çelik	
	Devir n (dak ⁻¹)	İlerleme vf (mm/dak)	Devir n (dak ⁻¹)	İlerleme vf (mm/dak)	Devir n (dak ⁻¹)	İlerleme vf (mm/dak)
2	11,560	280	7,560	170	6,300	140
3	8,920	320	5,560	200	4,620	170
4	7,560	570	4,620	350	3,880	280
5	6,300	600	3,780	360	3,160	300
6	5,560	660	3,360	410	2,840	330
8	4,200	710	2,520	380	2,100	350
10	3,260	610	2,000	300	1,680	300
12	2,740	520	1,680	250	1,360	240
16	2,200	410	1,360	200	1,100	200

Uygulama



- Kanal işleme derinliği (ap)
 - $D \leq \varnothing 2.5$ (ap = 0.3D)
 - $D > \varnothing 2.5$ (ap = 0.5D)



- Dik kenar frezeleme derinliği (ap)
 - $D \leq \varnothing 2.5$ (ap = 1.5D, ae = 0.05D)
 - $D > \varnothing 2.5$ (ap = 1.5D, ae = 0.1D)

* İş parçası sertçe bağlanmalı. Titreşim durumunda, R.P.M. ve ilerleme oranını aynı oranda azaltın



F Parmak Frezeler

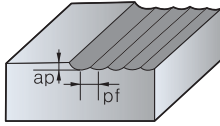
46

Z⁺ Endmill için Teknik Bilgi F

Önerilen Kesme Koşulu (ZPBE2000 Küresel)

İş Parçası Kesim Koşulları Çap (Ø)	Alaşımlı çelik ve karbon çelik (HRC30 altında)		Sertleşme öncesi çelik (HRC30~47)	
	Devir n (dak ⁻¹)	İlerleme vf (mm/dak)	Devir n (dak ⁻¹)	İlerleme vf (mm/dak)
1	30,000	2,880	30,000	2,520
1.2	30,000	3,060	28,800	2,580
1.5	30,000	3,240	28,800	2,700
2	29,820	3,420	28,680	2,880
3	19,860	3,600	19,080	3,180
4	14,940	3,600	14,340	3,180
5	11,160	3,480	10,680	2,940
6	8,340	2,910	8,040	2,460
8	6,660	2,520	6,420	2,100
10	5,580	2,220	5,340	1,860
12	4,170	1,770	4,008	1,500

Uygulama



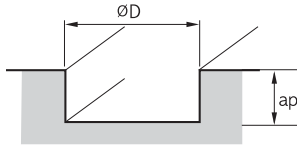
- $ap = 0.03D$
- $pf = 0.05D$

* İş parçası sertçe bağlanmalı. Titreşim durumunda, R.P.M. ve ilerleme oranını aynı oranda azaltın

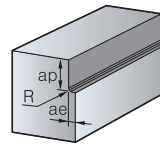
Önerilen Kesme Koşulu (ZPRE2000 Köşe Radyüslü)

İş Parçası Kesim Koşulları Çap (Ø)	Alaşımlı çelik ve karbon çelik (HRC30 altında)		Sertleşme öncesi çelik (HRC30~47)		Paslanmaz çelik	
	Devir n (dak ⁻¹)	İlerleme vf (mm/dak)	Devir n (dak ⁻¹)	İlerleme vf (mm/dak)	Devir n (dak ⁻¹)	İlerleme vf (mm/dak)
6	5,300	420	3,200	240	2,400	180
8	4,000	450	2,700	210	2,040	150
10	3,200	390	2,400	180	1,600	120
12	2,700	330	2,040	150	1,300	100
14	2,400	270	1,600	120	1,000	70
16	2,040	200	1,300	100	1,300	60

Uygulama



- Kanal işleme derinliği (ap)
- $ap: \leq 0.3D$



- Dik kenar frezeleme (ap)
- $ap: \leq 1.5D$
- $ae: \leq 0.1D$

* İş parçası sertçe bağlanmalı. Titreşim durumunda, R.P.M. ve ilerleme oranını aynı oranda azaltın

Not

- İşleme için amacınıza, hedef şekillere, işlemelerinizin koşullarına göre düzgünce önerilen koşulları ayarlayın lütfen
- İş parçası sertçe bağlanmalı. Titreşim durumunda, R.P.M. ve ilerleme oranını aynı oranda azaltın
- İşleme derinliği 3D üzerinde olduğunda, RPM ve ilerleme oranını azaltın

Parmak Frezeler



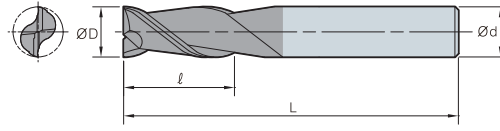
F

47



F Z⁺ Endmill

ZPFE2000 (Düz)



ØD	Tolerans
~Ø11.9	0.00~ -0.02
Ø12~	0.00~ -0.03



(mm)

Kod	ØD	Ød	ℓ	L
ZPFE				
2010-050-S4	1.0	4	3	50
2015-050-S4	1.5	4	4	50
2020-050-S4	2.0	4	6	50
2025-050-V6S4	2.5	4	6	50
2025-050-V8S4	2.5	4	8	50
2030-050-S4	3.0	4	9	50
2030-050	3.0	6	9	50
2035-050-S4	3.5	4	9	50
2035-050	3.5	6	9	50
2040-050-S4	4.0	4	11	50
2040-050	4.0	6	11	50
2045-050	4.5	6	11	50
2050-050	5.0	6	13	50
2060-050	6.0	6	16	50
2065-060	6.5	8	16	60
2070-060	7.0	8	20	60
2075-060	7.5	8	20	60
2080-060	8.0	8	20	60
2085-075	8.5	10	23	75
2090-075	9.0	10	23	75
2095-075	9.5	10	25	75
2100-075	10.0	10	25	75
2105-075	10.5	12	26	75
2110-075	11.0	12	28	75
2120-075	12.0	12	30	75
2140-100	14.0	14	34	100
2150-090	15.0	16	36	90
2160-100	16.0	16	36	100
2170-100	17.0	20	40	100
2180-100	18.0	18	40	100
2190-100	19.0	20	40	100
2200-100	20.0	20	40	100

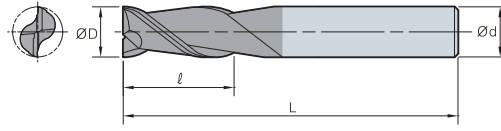


F

Parmak Frezeler



ZPSFE2000 (Kısa Düz)



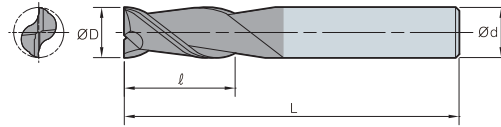
ØD	Tolerans
~Ø11.9	0.00~-0.02
Ø12~	0.00~-0.03



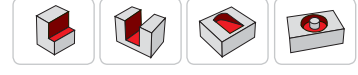
(mm)

Kod	ØD	Ød	l	L
ZPSFE				
2010-050-S4	1.0	4	2	50
2015-050-S4	1.5	4	2	50
2020-050-S4	2.0	4	3	50
2025-050-S4	2.5	4	4	50
2030-050-S4	3.0	4	5	50
2040-050-S4	4.0	4	6	50
2050-050	5.0	6	8	50
2060-050	6.0	6	9	50
2070-050	7.0	8	10	50
2080-050	8.0	8	12	50
2100-075	10.0	10	15	75
2120-075	12.0	12	18	75
2160-100	16.0	16	24	100

ZPLFE2000 (Uzun Düz)



ØD	Tolerans
~Ø11.9	0.00~-0.02
Ø12~	0.00~-0.03



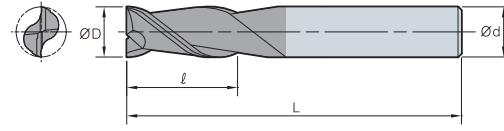
(mm)

Kod	ØD	Ød	l	L
ZPLFE				
2020-075-S4	2.0	4	6	75
2030-075-S4	3.0	4	9	75
2030-075	3.0	6	12	75
2040-075-S4	4.0	4	11	75
2050-075	5.0	6	20	75
2060-100	6.0	6	16	100
2060-100-V20S6	6.0	6	20	100
2080-075	8.0	8	20	75
2080-100	8.0	8	25	100
2100-100	10.0	10	30	100
2120-100	12.0	12	35	100
2160-150	16.0	16	36	150
2200-150	20.0	20	45	150



F Z⁺ Endmill

ZPLFE2000 (Uzun Kanallı)



ØD	Tolerans
~Ø11.9	0.00~ -0.02
Ø12~	0.00~ -0.03



(mm)

Kod	ØD	Ød	l	L
ZPLFE				
2020-075-V15S4	2.0	4	15	75
2030-075-V25S4	3.0	4	25	75
2040-075-V30S4	4.0	4	30	75
2050-075-V30S6	5.0	6	30	75
2060-075-V35S6	6.0	6	35	75
2080-100-V40S8	8.0	8	40	100
2100-100-V45S10	10.0	10	45	100
2120-100-V50S12	12.0	12	50	100
2140-100-V55S14	14.0	14	55	100
2160-150-V50S16	16.0	16	50	150
2160-150-V60S16	16.0	16	60	150
2180-150-V65S18	18.0	18	65	150
2200-150-V70S20	20.0	20	70	150



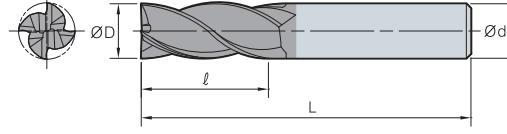
F

Parmak Frezeler

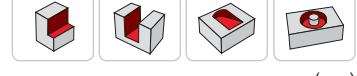
50



ZPFE4000 (Düz)



ØD	Tolerans
~Ø11.9	0.00~-0.02
Ø12~	0.00~-0.03



(mm)

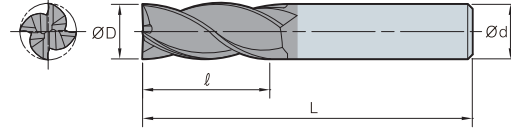
Kod	ØD	Ød	l	L
ZPFE				
4010-050-S4	1.0	4	3	50
4015-050-S4	1.5	4	5	50
4015-050	1.5	6	5	50
4020-050-S4	2.0	4	6	50
4020-050	2.0	6	6	50
4025-050-S4	2.5	4	8	50
4025-050	2.5	6	8	50
4030-050	3.0	6	6	50
4030-050-S4	3.0	4	9	50
4030-050-V9S6	3.0	6	9	50
4035-050-S4	3.5	4	11	50
4035-050	3.5	6	9	50
4040-050-S4	4.0	4	11	50
4040-050	4.0	6	11	50
4045-050	4.5	6	11	50
4050-050	5.0	6	8	50
4050-050-V13S6	5.0	6	13	50
4055-050	5.5	6	16	50
4060-050	6.0	6	16	50
4065-060	6.5	8	16	60
4070-060	7.0	8	20	60
4075-060	7.5	8	20	60
4080-060	8.0	8	20	60
4085-075	8.5	10	23	75
4090-075	9.0	10	23	75
4095-075	9.5	10	23	75
4100-075	10.0	10	25	75
4110-075	11.0	12	28	75
4120-075	12.0	12	30	75
4130-100	13.0	14	32	100
4140-075	14.0	14	32	75
4140-100	14.0	14	34	100
4150-100	15.0	16	36	100
4160-100	16.0	16	36	100
4160-100-V40S16	16.0	16	40	100
4160-100-V45S16	16.0	16	45	100
4170-100-S18	17.0	18	38	100
4180-100-S18	18.0	18	45	100
4200-100-S20	20.0	20	45	100





F Z⁺ Endmill

ZPSFE4000 (Kısa Düz)



ØD	Tolerans
~Ø11.9	0.00~ -0.02
Ø12~	0.00~ -0.03



(mm)

Kod	ØD	Ød	l	L
ZPSFE				
4010-050-S4	1.0	4	2	50
4015-050-S4	1.5	4	2	50
4020-050-S4	2.0	4	3	50
4025-050-S4	2.5	4	4	50
4030-050-S4	3.0	4	5	50
4040-050-S4	4.0	4	6	50
4050-050	5.0	6	8	50
4060-050	6.0	6	9	50
4070-050	7.0	8	10	50
4080-050	8.0	8	12	50
4100-075	10.0	10	15	75
4120-075	12.0	12	18	75
4160-100	16.0	16	24	100



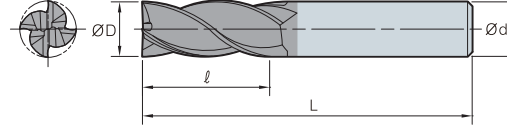
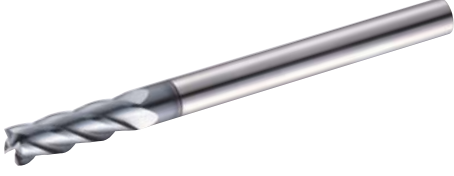
F

Parmak Frezeler

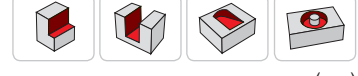
52



ZPLFE4000 (Uzun Düz)



ØD	Tolerans
~Ø11.9	0.00~-0.02
Ø12~	0.00~-0.03



(mm)

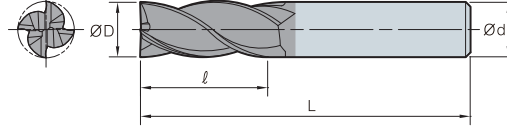
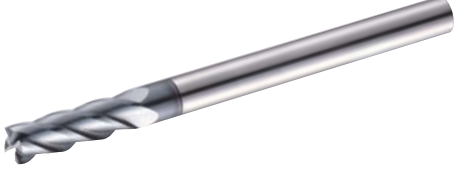
Kod	ØD	Ød	l	L
ZPLFE				
4020-075-S4	2.0	4	10	75
4030-075-S4	3.0	4	12	75
4040-075-S4	4.0	4	11	75
4040-050-V15S4	4.0	4	15	75
4050-075	5.0	6	20	75
4060-075	6.0	6	16	75
4060-075-V20S6	6.0	6	20	75
4080-075	8.0	8	20	75
4080-100-S8	8.0	8	25	100
4100-100	10.0	10	30	100
4100-100-V35S10	10.0	10	35	100
4120-100	12.0	12	35	100
4160-150	16.0	16	36	150
4200-150	20.0	20	45	150



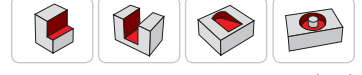


F Z⁺ Endmill

ZPLFE4000 (Uzun Kanallı)



ØD	Tolerans
~Ø11.9	0.00~ -0.02
Ø12~	0.00~ -0.03



(mm)

Kod	ØD	Ød	l	L
ZPLFE				
4010-050-V04S4	1.0	4	4	50
4020-050-V10S4	2.0	4	10	50
4030-060-V15S4	3.0	4	15	60
4030-060-V16S6	3.0	6	16	60
4040-060-V20S4	4.0	4	20	60
4040-075-V20S6	4.0	6	20	75
4040-075-V30S4	4.0	4	30	75
4050-075-V25S6	5.0	6	25	75
4050-075-V30S6	5.0	6	30	75
4060-075-V30S6	6.0	6	30	75
4060-075-V35S6	6.0	6	35	75
4080-100-V35S8	8.0	8	35	100
4080-100-V40S8	8.0	8	40	100
4100-100-V45S10	10.0	10	45	100
4100-100-V50S10	10.0	10	50	100
4120-100-V45S12	12.0	12	45	100
4120-100-V50S12	12.0	12	50	100
4140-100-V45S14	14.0	14	45	100
4160-150-V50S16	16.0	16	50	150
4160-150-V60S16	16.0	16	60	150
4160-150-V70S16	16.0	16	70	150
4180-150-V70S18	18.0	18	70	150
4200-150-V70S20	20.0	20	70	150

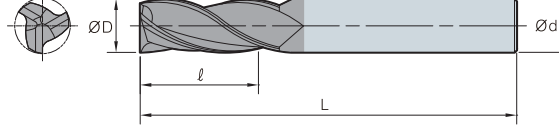


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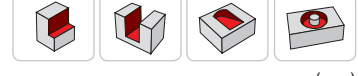
Parmak Frezeler



ZPFE3000 (Düz)



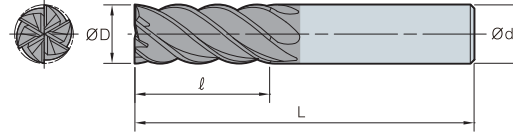
ØD	Tolerans
~Ø11.9	0.00~-0.02
Ø12~	0.00~-0.03



(mm)

Kod	ØD	Ød	l	L
ZPFE				
3020-050-S4	2.0	4	6	50
3030-050-S4	3.0	4	9	50
3040-050-S4	4.0	4	11	50
3050-050	5.0	6	13	50
3060-050	6.0	6	16	50
3065-060	6.5	8	16	60
3080-060	8.0	8	20	60
3095-075	9.5	10	24	75
3100-075	10.0	10	25	75
3120-075	12.0	12	30	75
3106-100	16.0	16	36	100
3180-100	18.0	18	40	100
3200-100	20.0	20	45	100
3250-100	25.0	25	50	100

ZPFE6000 (Düz)



ØD	Tolerans
~Ø11.9	0.00~-0.02
Ø12~	0.00~-0.03



(mm)

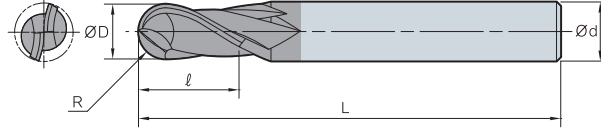
Kod	ØD	Ød	l	L
ZPFE				
6060-050	6.0	6	15	50
6080-060	8.0	8	20	60
6100-075	10.0	10	25	75
6120-075	12.0	12	30	75
6160-100	16.0	16	36	100
6200-100	20.0	20	45	100





F Z⁺ Endmill

ZPBE2000 (Küresel)



ØD	Tolerans
~Ø11.9	0.00~ -0.02
Ø12~	0.00~ -0.03



(mm)

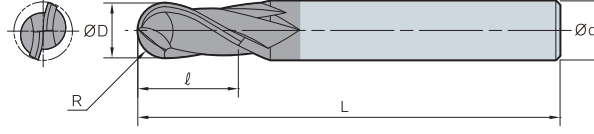
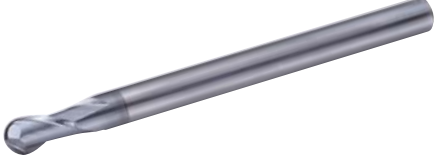
Kod	R	ØD	Ød	ℓ	L
ZPBE					
2008-050-S4	0.4	0.8	4	1.6	50
2009-050-S4	0.5	0.9	4	1.8	50
2010-050-S4	0.5	1.0	4	2	50
2015-050-S4	0.8	1.5	4	3	50
2020-050-S4	1.0	2.0	4	4	50
2020-050	1.0	2.0	6	4	50
2025-050-S4	1.3	2.5	4	5	50
2030-050-S4	1.5	3.0	4	6	50
2030-050	1.5	3.0	6	6	50
2040-050-S4	2.0	4.0	4	8	50
2040-050	2.0	4.0	6	8	50
2050-050	2.5	5.0	6	10	50
2060-050	3.0	6.0	6	12	50
2070-060	3.5	7.0	8	14	60
2080-060	4.0	8.0	8	14	60
2090-075	4.5	9.0	10	16	75
2100-075	5.0	10.0	10	18	75
2110-075	5.5	11.0	12	20	75
2120-075	6.0	12.0	12	22	75
2130-090	6.5	13.0	14	26	90
2140-090	7.0	14.0	14	26	90
2150-090	7.5	15.0	16	30	90
2160-100	8.0	16.0	16	30	100
2200-100	10.0	20.0	20	38	100



F Parmak Frezeler



ZPLBE2000 (Uzun Küresel)



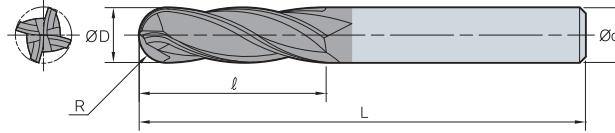
ØD	Tolerans
~Ø11.9	0.00~ -0.02
Ø12~	0.00~ -0.03



(mm)

Kod	R	ØD	Ød	l	L
ZPLBE					
2020-075-S4	1.0	2.0	4	4	75
2030-075-S4	1.5	3.0	4	6	75
2030-075	1.5	3.0	6	6	75
2040-075-S4	2.0	4.0	4	8	75
2040-075	2.0	4.0	6	8	75
2050-075	2.5	5.0	6	10	75
2060-075	3.0	6.0	6	12	75
2080-100	4.0	8.0	8	14	100
2100-100	5.0	10.0	10	18	100
2120-100	6.0	12.0	12	20	100

ZPBE4000 (Küresel)



ØD	Tolerans
~Ø11.9	0.00~ -0.02
Ø12~	0.00~ -0.03



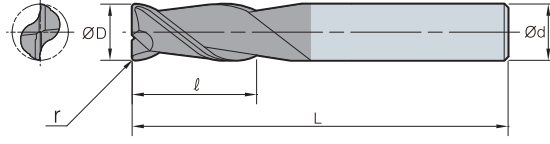
(mm)

Kod	R	ØD	Ød	l	L
ZPBE					
4020-050-S4	1.0	2.0	4	4	50
4025-050-S4	1.3	2.5	4	5	50
4030-050-S4	1.5	3.0	4	6	50
4030-050	1.5	3.0	6	6	50
4040-050-S4	2.0	4.0	4	8	50
4040-050	2.0	4.0	6	8	50
4050-050	2.5	5.0	6	10	50
4060-050	3.0	6.0	6	12	50
4070-060	3.5	7.0	8	14	60
4080-060	4.0	8.0	8	14	60
4090-075	4.5	9.0	10	16	75
4100-075	5.0	10.0	10	18	75
4110-075	5.5	11.0	12	20	75
4120-075	6.0	12.0	12	22	75
4140-075	7.0	14.0	14	24	75
4160-100	8.0	16.0	16	30	100
4200-100	10.0	20.0	20	38	100



F Z⁺ Endmill

ZPRE2000 (Köşe Radyüslü)



ØD	Tolerans
~Ø11.9	0.00~ -0.02
Ø12~	0.00~ -0.03



(mm)

Kod	ØD	Ød	l	L	r
ZPRE					
2010-050-S4-R02	1.0	4	3	50	0.2
2020-050-S4-R02	2.0	4	6	50	0.2
2030-050-S4-R02	3.0	4	9	50	0.2
2030-050-R02	3.0	6	9	50	0.2
2030-050-S4-R03	3.0	4	9	50	0.3
2030-050-R03	3.0	6	9	50	0.3
2030-050-S4-R05	3.0	4	9	50	0.5
2030-050-R05	3.0	6	9	50	0.5
2040-050-S4-R02	4.0	4	11	50	0.2
2040-050-R02	4.0	6	11	50	0.2
2040-050-S4-R03	4.0	4	11	50	0.3
2040-050-R03	4.0	6	11	50	0.3
2040-050-S4-R05	4.0	4	11	50	0.5
2040-050-R05	4.0	6	11	50	0.5
2040-050-S4-R10	4.0	4	11	50	1.0
2050-050-R02	5.0	6	13	50	0.2
2050-050-R03	5.0	6	13	50	0.3
2050-050-R05	5.0	6	13	50	0.5
2050-050-R010	5.0	6	13	50	1.0
2060-050-R05	6.0	6	16	50	0.5
2060-050-R10	6.0	6	16	50	1.0
2060-050-R15	6.0	6	16	50	1.5
2060-050-R20	6.0	6	16	50	2.0
2080-060-R03	8.0	8	20	60	0.3
2080-060-R05	8.0	8	20	60	0.5
2080-060-R10	8.0	8	20	60	1.0
2080-060-R15	8.0	8	20	60	1.5
2080-060-R20	8.0	8	20	60	2.0
2100-075-R03	10.0	10	25	75	0.3
2100-075-R06	10.0	10	25	75	0.6
2100-075-R10	10.0	10	25	75	1.0
2100-075-R15	10.0	10	25	75	1.5
2100-075-R20	10.0	10	25	75	2.0
2100-075-R30	10.0	10	25	75	3.0
2120-075-R05	12.0	12	30	75	0.5
2120-075-R10	12.0	12	30	75	1.0
2120-075-R15	12.0	12	30	75	1.5
2120-075-R20	12.0	12	30	75	2.0
2120-075-R30	12.0	12	30	75	3.0
2160-100-R10	16.0	16	36	100	1.0
2160-100-R20	16.0	16	36	100	2.0
2160-100-R30	16.0	16	36	100	3.0

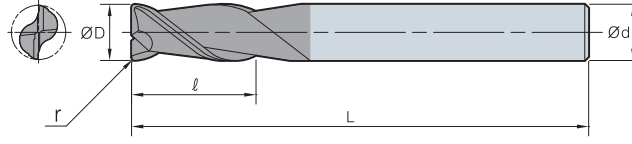
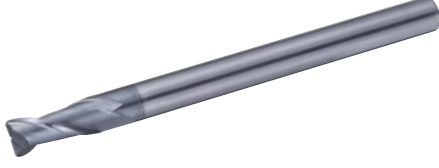


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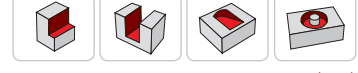
Parmak Frezeler



ZPLRE2000 (Uzun Köşe Radyüslü)



ØD	Tolerans
~Ø11.9	0.00~ -0.02
Ø12~	0.00~ -0.03



(mm)

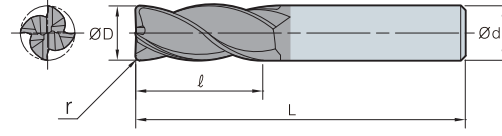
Kod	ØD	Ød	l	L	r
ZPLRE					
2060-075-R05	6.0	6	16	75	0.5
2060-075-R10	6.0	6	16	75	1.0
2060-075-R15	6.0	6	16	75	1.5
2080-100-R05	8.0	8	20	100	0.5
2080-100-R10	8.0	8	20	100	1.0
2080-100-R15	8.0	8	20	100	1.5
2100-100-R05	10.0	10	25	100	0.5
2100-100-R10	10.0	10	25	100	1.0
2100-100-R15	10.0	10	25	100	1.5
2100-100-R20	10.0	10	25	100	2.0
2120-100-R05	12.0	12	30	100	0.5
2120-100-R10	12.0	12	30	100	1.0
2120-100-R15	12.0	12	30	100	1.5
2120-100-R20	12.0	12	30	100	2.0
2160-150-R05	16.0	16	36	150	0.5
2160-150-R10	16.0	16	36	150	1.0
2160-150-R15	16.0	16	36	150	1.5
2160-150-R20	16.0	16	36	150	2.0





F Z⁺ Endmill

ZPRE4000 (Köşe Radyüslü)



ØD	Tolerans
~Ø11.9	0.00~ -0.02
Ø12~	0.00~ -0.03



(mm)

Kod	ØD	Ød	l	L	r
ZPRE					
4015-050-S4-R02	1.5	4	5	50	0.2
4020-050-S4-R02	2.0	4	6	50	0.2
4030-050-S4-R02	3.0	4	9	50	0.2
4030-050-S4-R03	3.0	4	9	50	0.3
4030-050-S4-R05	3.0	4	9	50	0.5
4040-050-S4-R02	4.0	4	11	50	0.2
4040-050-S4-R03	4.0	4	11	50	0.3
4040-050-S4-R05	4.0	4	11	50	0.5
4040-050-S4-R10	4.0	4	11	50	1.0
4045-050-R10	4.5	6	12	50	1.0
4050-050-R02	5.0	6	13	50	0.2
4050-050-R05	5.0	6	13	50	0.5
4050-050-R10	5.0	6	13	50	1.0
4050-050-R15	5.0	6	13	50	1.5
4060-050-R05	6.0	6	16	50	0.5
4060-050-R10	6.0	6	16	50	1.0
4060-050-R15	6.0	6	16	50	1.5
4080-060-R03	8.0	8	20	60	0.3
4080-060-R05	8.0	8	20	60	0.5
4080-060-R10	8.0	8	20	60	1.0
4080-060-R15	8.0	8	20	60	1.5
4080-060-R20	8.0	8	20	60	2.0
4100-075-R03	10.0	10	25	75	0.3
4100-075-R05	10.0	10	25	75	0.5
4100-075-R10	10.0	10	25	75	1.0
4100-075-R15	10.0	10	25	75	1.5
4100-075-R20	10.0	10	25	75	2.0
4100-075-R25	10.0	10	25	75	2.5
4100-075-R30	10.0	10	25	75	3.0
4120-075-R05	12.0	12	30	75	0.5
4120-075-R10	12.0	12	30	75	1.0
4120-075-R15	12.0	12	30	75	1.5
4120-075-R20	12.0	12	30	75	2.0
4120-075-R25	12.0	12	30	75	2.5
4120-075-R30	12.0	12	30	75	3.0
4160-100-R05	16.0	16	36	100	0.5
4160-100-R10	16.0	16	36	100	1.0
4160-100-R20	16.0	16	36	100	2.0
4160-100-R30	16.0	16	36	100	3.0

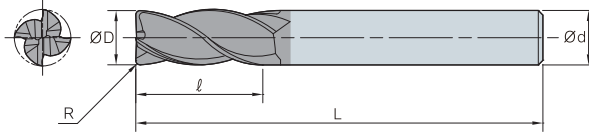


F Parmak Frezeler

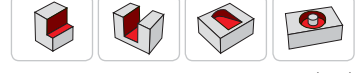
60



ZPLRE4000 (Uzun Köşe Radyüslü)



ØD	Tolerans
~Ø11.9	0.00~ -0.02
Ø12~	0.00~ -0.03



(mm)

Kod	ØD	Ød	l	L	r
ZPLRE					
4060-075-R05	6.0	6	16	75	0.5
4060-075-R10	6.0	6	16	75	1.0
4060-075-R15	6.0	6	16	75	1.5
4080-100-R05	8.0	8	20	100	0.5
4080-100-R10	8.0	8	20	100	1.0
4080-100-R15	8.0	8	20	100	1.5
4080-100-R20	8.0	8	20	100	2.0
4100-100-R05	10.0	10	25	100	0.5
4100-100-R10	10.0	10	25	100	1.0
4100-100-R15	10.0	10	25	100	1.5
4100-100-R20	10.0	10	25	100	2.0
4120-100-R05	12.0	12	30	100	0.5
4120-100-R10	12.0	12	30	100	1.0
4120-100-R15	12.0	12	30	100	1.5
4120-100-R20	12.0	12	30	100	2.0
4120-100-R30	12.0	12	30	100	3.0
4160-150-R05	16.0	16	36	150	0.5
4160-150-R10	16.0	16	36	150	1.0
4160-150-R15	16.0	16	36	150	1.5
4160-150-R20	16.0	16	36	150	2.0
4160-150-R30	16.0	16	36	150	3.0

